and not a merit that it should be wholly free from mathematical symbolism. However, it is clear that M. Pacotte has read and thought deeply, and if we have to confess that the results of his labours are not very helpful to us, we are most ready to admit that they may be very helpful to others.

(4) Prof. Petrovitch here pursues the suggestive train of thought which he has started in earlier works. He begins with the familiar observation that physical metaphors are used in connection with the most diverse events; thus we speak of the *cooling* of enthusiasm or the *oscillation* of public opinion. Such metaphors indicate that the most diverse phenomena follow tendencies (*allures*) characterisic of mechanics. He seeks accordingly to classify these tendencies into a few well-marked groups and to place all phenomena of all kinds whatsoever within these groups according to the nature of their tendencies. These ideas (of which the briefest outline must suffice here) lead naturally to a scrutiny of the whole range of knowledge; M. Petrovitch's knowledge is wide and, so far as we can test it, accurate; yet he carries it easily. Accordingly his book will appeal to many who are not immediately interested in his epistemological theses.

We are inclined to think, however, that he overrates the importance of the resemblances he studies. Thus he maintains that when he has analysed any phenomenon according to its tendencies and displayed its mechanical analogies, he has explained the phenomenon in the sense used by Kelvin when he said that to explain a phenomenon was to construct a mechanical model of it. Such a doctrine we think might lead to the most dangerous fallacies if applied to psychology and politics; and though M. Petrovitch, confining himself to analysis and not to construction, seems always to stop short of the precipice, he approaches it very nearly and might well lead shallow thinkers over it.

(5) Prof. Lenard has republished in pamphlet form an article which appeared in Stark's "Jahrbuch." It is one more attempt to avoid the principle of relativity and quantum theory, and seems, as usual, to forget that it is impossible to avoid them entirely, because, since they are formal theories in accord with experiment, any other physical theory so in accord must be formally in accord with them. The basic idea of Prof. Lenard's theory is that every body has its private ether, disturbances in a private ether being transferred in some way (undefined) to a primary ether (Uräther) for transmission to a great distance. To those so attached to ethers that the idea is attractive of an infinite number of coincident ethers all moving at any point with different velocities, the idea will probably appeal. But we confess that we see no need for the Uräther; so far as we can see, private ethers would suffice, together with the assumption that each observer can only perceive disturbances set up in his private ether. (Cf. *Phil. Mag.* 19. 189. 1910.)

(6) Prof. Planck publishes here a collection of his semi-popular lectures and essays, partly on radiation and quantum theory, partly on scientific principles. All that he says here will, of course, be familiar already to serious students, while for the general reader books in a foreign tongue are seldom useful. No comment therefore seems necessary; to praise Prof. Planck's work would be impertinent.

(7) Finally, we come to M. Villey's very interesting volume, of which the first part only is published as yet. Its intention is "A ceux qui possèdent déjà les connaissances normalement enseignées dans les traités de physique élémentaire, exposer les mêmes matières sous une forme assez renouvelée pour stimuler leur curiosité et élargir leurs points de vue" and "A ceux qui veulent acquérir ces connaissances en mettant à profit leur loisir, les présenter non sous l'aspect du manuel pédagogique, mais sous une forme plus attrayante et de lecture plus facile." It is the second object which appeals more directly to us and, we think, to the author. It is impossible for a professional physicist to decide definitely how far the aim has been achieved; we must "try it on the dog"; but we are certain that if the author has failed, his task is impossible and that the fault lies not with him but with the audience he is addressing. The book is a model of that simple, lucid, and logical exposition of which the French language—or at least the French people—alone seems capable. Every one, however deeply versed in physics, will find in it something to stimulate his interest and imagination. M. Villey deserves the thanks of all who desire a wider diffusion of scientific knowledge; we hope that an English translation will soon appear—if only somebody can be found with the courage and ability to undertake it.

N. R. C.

Strasburger's Text-book of Botany.

Strasburger's Text-book of Botany. Rewritten by Dr. H. Fitting, Dr. L. Jost, Dr. H. Schenck, Dr. G. Karsten. Fifth English Edition Revised with the Fourteenth German Edition by Prof. W. H. Lang. Pp. xi + 799. (London: Macmillan and Co., Ltd., 1921.) 31*s.* 6*d.* net.

THE last English edition of this well-known text-book was published in 1912, and the appearance of the present volume will be welcomed by the large number of students and teachers who are already familiar with its many excellent features. This edition appears under a new title, as "Strasburger's Text-

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book of Botany," to commemorate the original founder of the work. The general plan of the book remains the same. The first part, entitled "General Botany," includes morphology and physiology; the second part, "Special Botany," is also in two divisions, the first dealing with Thallophyta, Bryophyta, and Pteridophyta, and the second with the Spermatophyta.

The division on morphology, which is contributed by Prof. Fitting, has been entirely rearranged and largely rewritten. It now begins with a consideration of the cell, tissues and tissue systems, and then under the heading of "Organography" deals with the external form and internal structure of the members of the plant. This arrangement permits of a logical development of the subject, in which some consideration is given to form in relation to function. It is clear, however, that the subjects included in this divison cannot be adequately treated in the 206 pages devoted to it. Such subjects, for example, as leaf fall, structure of the hypocotyl, and the phylogeny of the vascular system, receive very scanty treatment.

In a new section six pages are devoted to the theory of descent and the origin of new species. It is doubtful whether such a condensed account of this subject will be of value to the student even for examination purposes. It is true that, as in other sections of the book, there are references to the more important publications on this subject, but since both here and in the sub-section of physiology dealing with heredity and variability the references are almost exclusively to German authors, these will be of limited use to the English student.

The section on physiology, by Prof. Jost, is on the same general lines as that in the fourth edition. It has, however, been very carefully revised and brought up to date, and provides an excellent survey of the subject.

In the Cryptogamic section, for which Prof. Schenck is responsible, the most recent additions to the subject have been brought under review. Among the Thallophytes, alternation of generations is described and figured in the Laminariaceæ, and Kniep's work on the Hymenomycetes is included. The treatment of the vascular cryptogams has been much improved by the insertion of the more important fossil forms in their natural positions among the existing families.

The work as a whole presents a comprehensive and accurate account of the subject. Its main defect is that, in including so much within the limits of a single volume, the treatment of the various sections has suffered from undue compression. The book was written for German students and it cannot fully satisfy the requirements of English teachers, since it does not give prominence to those aspects of the subject with which the English School of botanists has been identified. Nevertheless, it has already established itself as a standard text-book, and in its present revised form and at its extremely moderate price it will meet the needs of many different types of student.

R. J. T.

German Monographs on Biochemistry.

Die Biochemie in Einzeldarstellungen. Herausgegeben von Dr. A. Kanitz.

(1) *Temperatur und Lebensvorgänge.* Von Dr. A. Kanitz. Pp. x+175. 54 marks.

(2) *Über künstliche Ernährung und Vitamine.* Von Prof. Dr. F. Röhmann. Pp. vi+150+2 plates. 42 marks.

(3) *Über partielle Eiweisshydrolyse.* Von Prof. Dr. M. Siegfried. Pp. iv+64. 15 marks.

(4) *Die Einwirkung von Mikroorganismen auf die Eiweisskörper.* Von Dr. P. Hirsch. Pp. x+256. 63 marks.

(Berlin: Gebrüder Borntraeger, 1915–1918.)

THE present may be emphatically termed the period of Monographs of Science. The vast accumulation of facts has long passed the bounds prescribed by the general treatises on physics or chemistry, in which it was formerly possible to find a readable and critical treatment of the subject as a whole. These were succeeded by encyclopædic dictionaries, of the type of Beilstein, which, however useful and indeed invaluable for reference, make no claim to be readable or even critical. In all branches of science, however, the demand is insistent for a comparatively brief and comprehensive account of the present state of knowledge, and it is to meet this that the various series of sectional monographs have sprung up. Among the first of these were the admirable monographs on biochemistry edited by Hopkins and Plimmer from 1908 onwards, and in the series now under review we have the German equivalent of these. Originated as late as 1915, comparatively few volumes have as yet been issued, but the promised list of publications indicates, both by the subjects proposed and the distinction of the authors, that they will form a valuable addition to the biochemist's bookshelf.

(1) The effect of temperature on life processes is here discussed in great detail. After a general introduction in which the physical chemistry of the subject is considered the characteristic optimum effect produced in living organisms is fully analysed. A special part follows in which a summary of the literature is made and the data are incorporated in tables, each class of phenomenon, such as the heart-beat, the action of

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